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Inaugural Essay

On

Fractures Dislocations &c:
for the

Degree of Doctor of Medicine
in.

The University of Pennsylvania.
By

Reuben A. Gentry

Williamson County Tennessee.

Philadelphia January 15th

1828

in the following

and suspended

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Benjamin W. Dudley, M.D.
Professor of Anatomy and Surgery in
Pennsylvania University.

Dear Sir,

Your unwearied endeavours, as a publick and private preceptor in conducting me through the bewildering labyrinths of sophistry and error, to those simple and elementary truths, from the lights of which, the scientific physician can alone expect to direct his way; together with many acts of individual kindness, have fixed upon my memory, feelings of gratitude and affection, which will only cease with the term of my existence. For these multiplied benefits, permit me to inscribe to you this humble way - as an assurance of the warm estimation in which I hold you, as an in-

individual of prominent worth, talents, and
attainments.

That the brilliancy of your professional ca-
reer may be unclouded; that the profession
may ever be proud of your superior talents,
extensive acquirements, and great useful-
ness; and that your life may be long, pros-
perous, and happy, is the heart-felt wish of

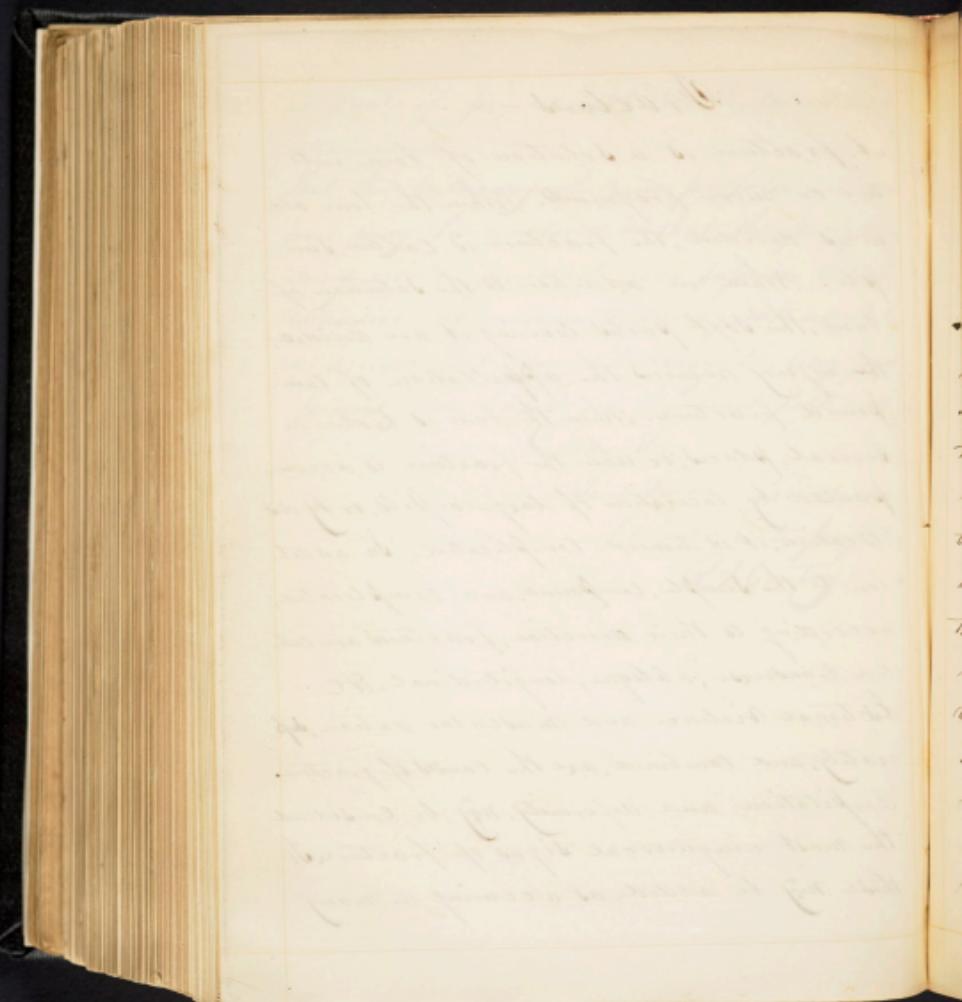
Dear Sir,

Dear sincere friend, and
affectionate pupil,
R. H. Gentry.

Fractures

A fracture is a solution of bone into two or more fragments. When the bone alone is divided, the fracture is called simple. When in addition to the solution of bone, the soft parts covering it are divided, the injury receives the appellation of compound fracture. When the bone is broken in several places, or when the fracture is accompanied by laceration of large vessels, or by dislocation, it is termed complicated. In addition to the simple, compound, and complicated, according to their direction, fractures are called transverse, oblique, longitudinal, &c.

External violence and muscular action, separately, and combined, are the causes of fracture. Impulsion and deformity, may be considered the most unequivocal signs of fracture. It should be added, as occurring in many



Edema, pain, Swelling, and inability to move the limb.

Generally, the first appearance which presents itself to the surgeon, in his examination of a fracture, is the displacement of the ends of bone, hence, the first indication, is the reduction of the fragments to their natural situation.

After the ends of bone are placed in apposition, the contractile power of the muscles, has a constant tendency to separate them, and when excited, to draw them into their substance, which they irritate, and excite to additional contraction. In this way, the limb is sometimes reduced to two-thirds its original length, and the soft tissues very much lacerated. From these facts it is obvious, that the complete suspension of muscular action, is one of the most important indications, in the treatment of fractures.

When violence has been offered any part, nat-

are, to restore the part to its pristine healthy condition, instituted a protracted action, and when unrestrained, generally transcends the bounds compatible with speedy recovery. Now as a high grade of inflammation, is known not to be in harmony with the recuperative process, the question, then when it has occurred, the removal of it, is by common consent the most important indication in the treatment of fractures. The pain attending fractures is in some cases almost insupportable, and the removal or mitigation of it, not only conduces to the comfort of the individual, but guarantees the favourable termination of the accident.

To fulfil the first indication, we resort to elevation, counter-elevation, and evaporation.

To suppress muscular action, and control inflammation, I recommend the bandage or roller.

Having recommended the bandage, I deem it necessary, and not irrelevant to the subject, to make a few remarks on its application.

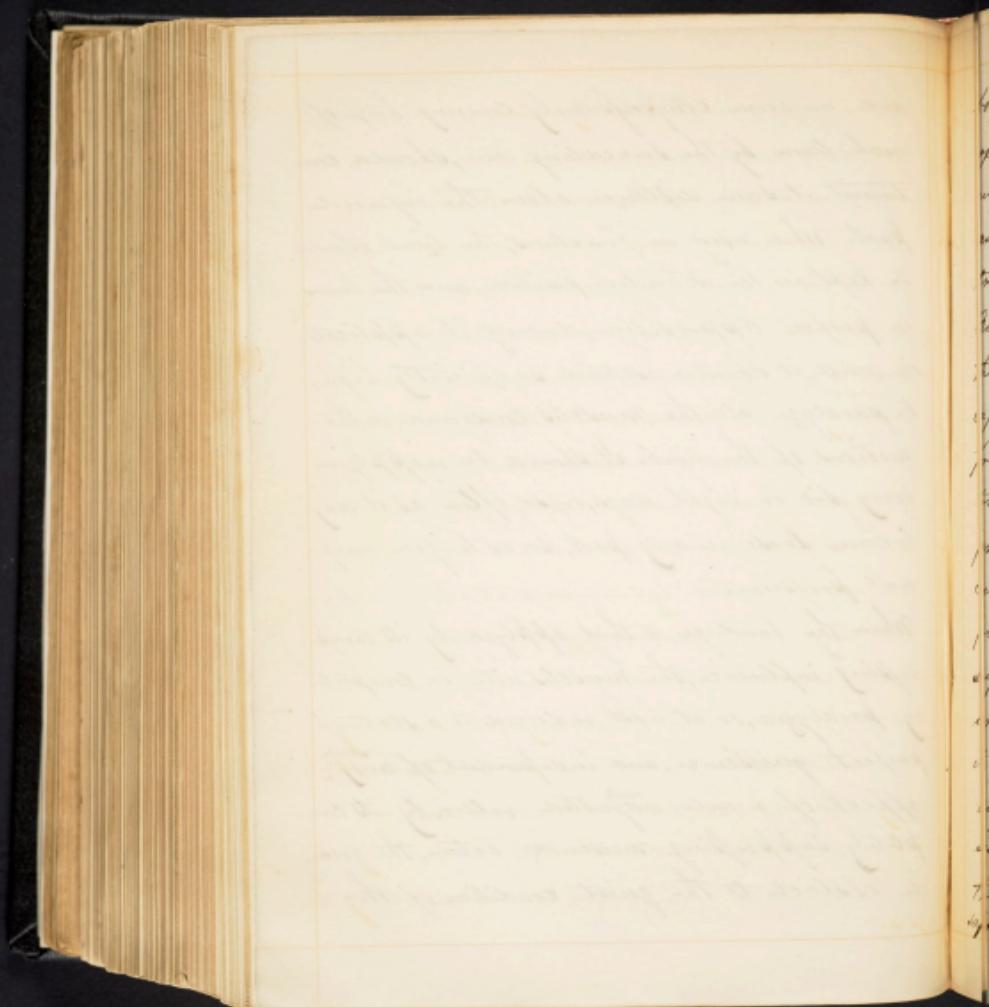
The salutary effects of the bandage depend on its judicious application, and I have no doubt, that the consequences arising from its improper application, have caused it to be condemned and discarded by many, as producing serious and pernicious consequences.

A very common mode of applying it, is to bind it tightly around the part sustaining injury, leaving the parts below, unprotected by it. In this way, it acts precisely as a ligature, producing derangement in the circulation, particularly of the venous blood, and consequent tumescion, sloughing, and mortification.

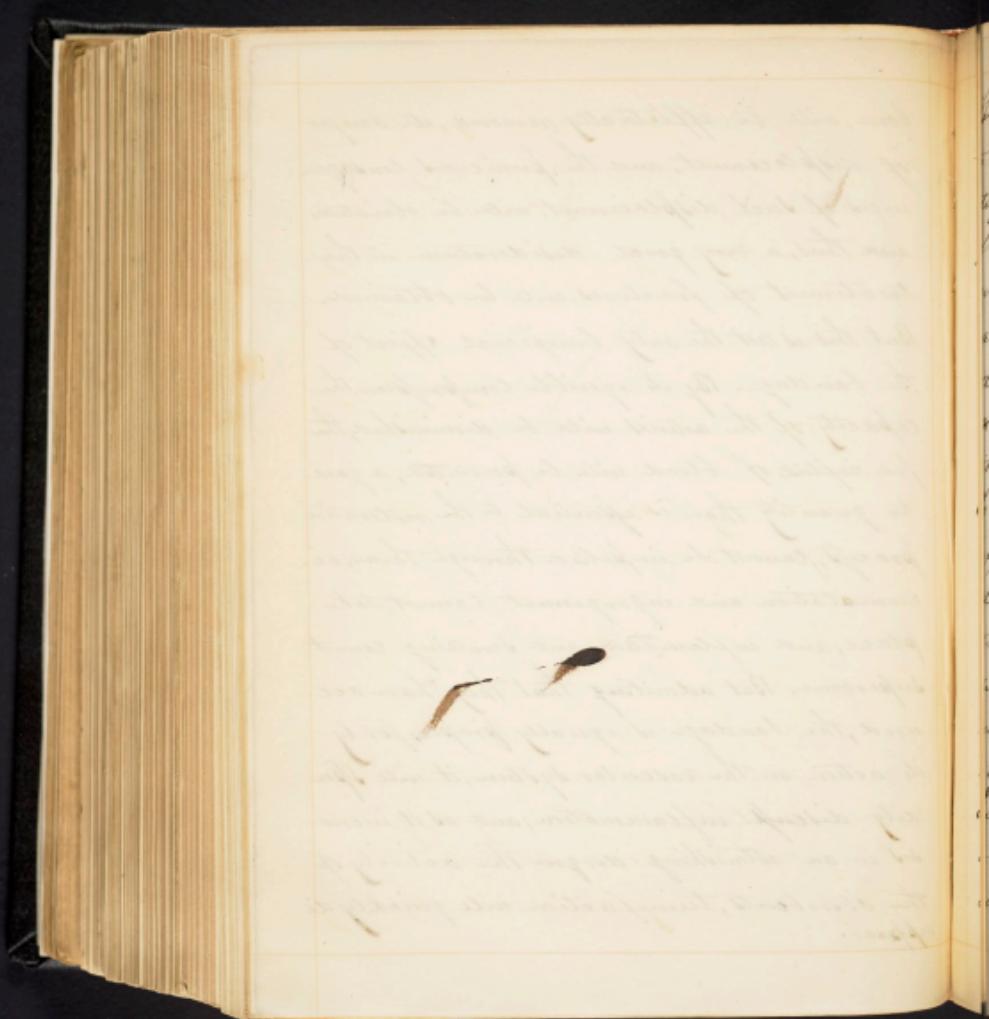
In applying the bandage, we should invariably commence directly at the extremity of the limb, and taking care to make regular

and uniform compression, by covering half of each turn by the succeeding one, should continue it some distance above the injured part. When used in fractures, the limb should be kept in the extended position, and the bands in perfect apposition, during its application, and it should extend sufficiently high, to ~~paralyze~~ all the muscles concerned in the motions of the limb. It should be reapplied every six or eight days, or so often as it may become loose in any part, so as to give unequal pressure.

When the bandage is thus applied, by its compressing influence, the muscles will be completely paralysed, or at least reduced to a state of perfect quietness, and independent of ^{other} any effect of a well adjusted roller, by its completely supporting muscular action, the greater obstacle to the quiet condition of the

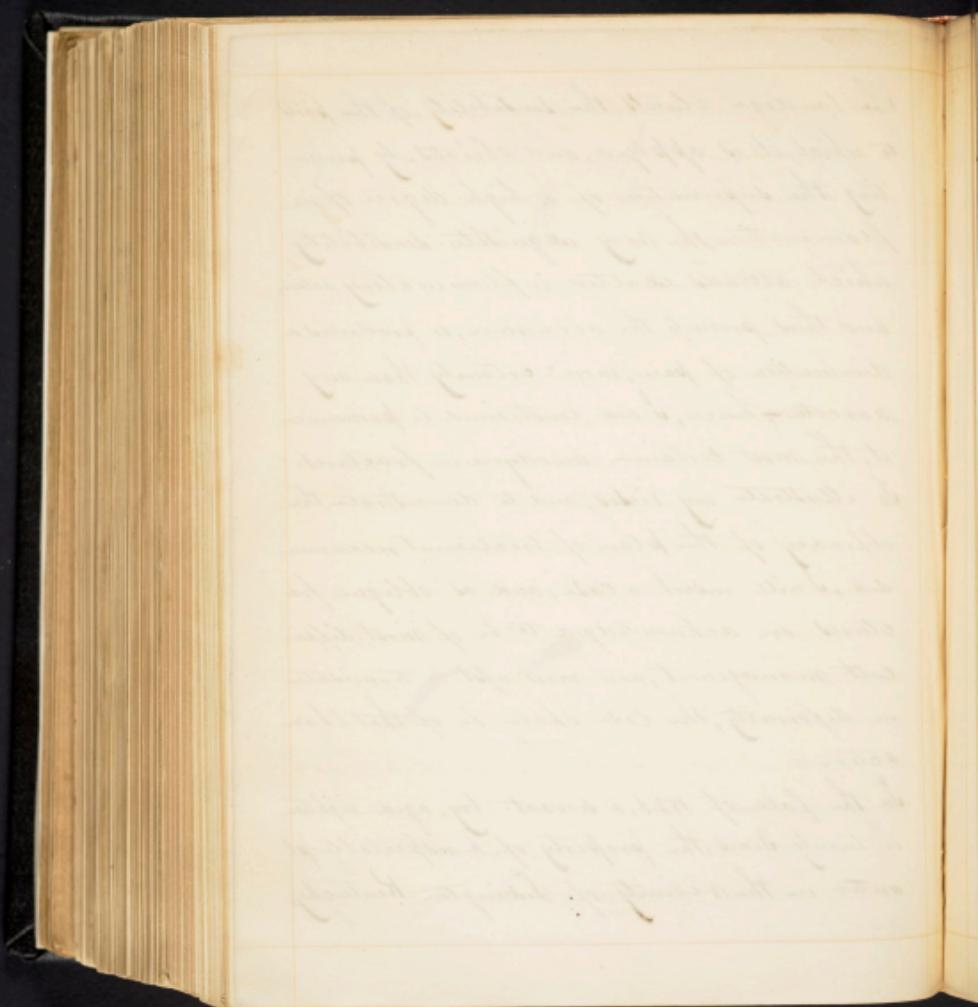


bone, will be effectually removed, all danger of displacement, and the pernicious consequences of such displacement, will be obviated, and thus, a very great desideratum in the treatment of fractures will be obtained. But this is not the only beneficial effect of the bandage. By its equal compression, the capacity of the arteries will be diminished, the free inflow of blood will be prevented, a greater quantity than is essential to the restoration process, cannot be impelled through them, accumulation and engorgement cannot take place, and inflammation and swelling cannot supervene. But admitting that they have occurred, the bandage is equally proper, for by its action on the vascular system, it will speedily disrupt inflammation, and as it increases in an astonishing degree the activity of the absorbents, tumefaction will quickly disappear.

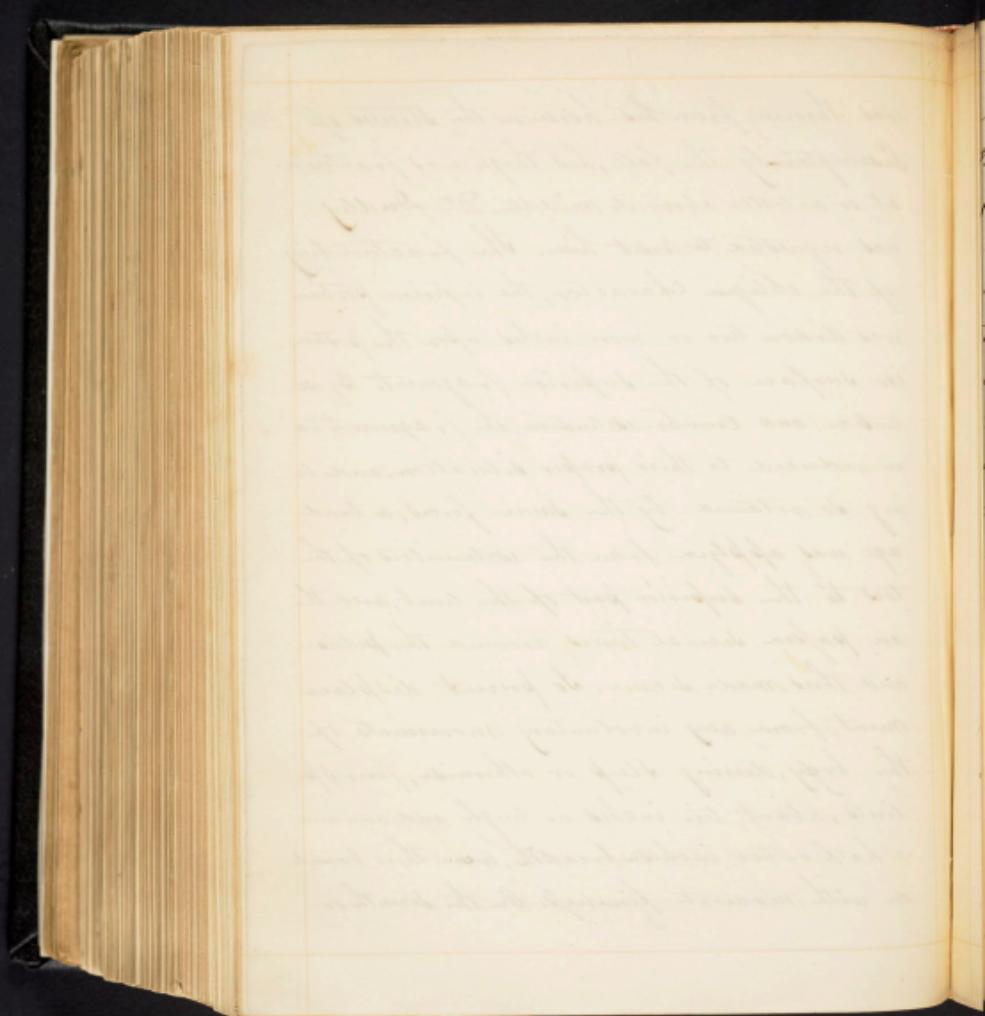


The bandage blunts the sensibility of the parts to which it is applied, and obviates, by preventing the suppuration of a high degree of inflammation, the very exquisite sensibility which attends exalted inflammatory action, and thus prevents the occurrence, or produces a diminution of pain, more certainly than any narcotic - hence, I am constrained to pronounce it, the most certain anodyne in fractures. To illustrate my views, and to demonstrate the efficacy of the plan of treatment recommended, I will insert a case; and as oblique fractures are acknowledged to be of most difficult management, and most apt to terminate in deformity, the case shall be of that character.

In the fall of 1826, a servant boy, aged eighteen or twenty years, the property of a respectable planter in the vicinity of Lexington Kentucky,



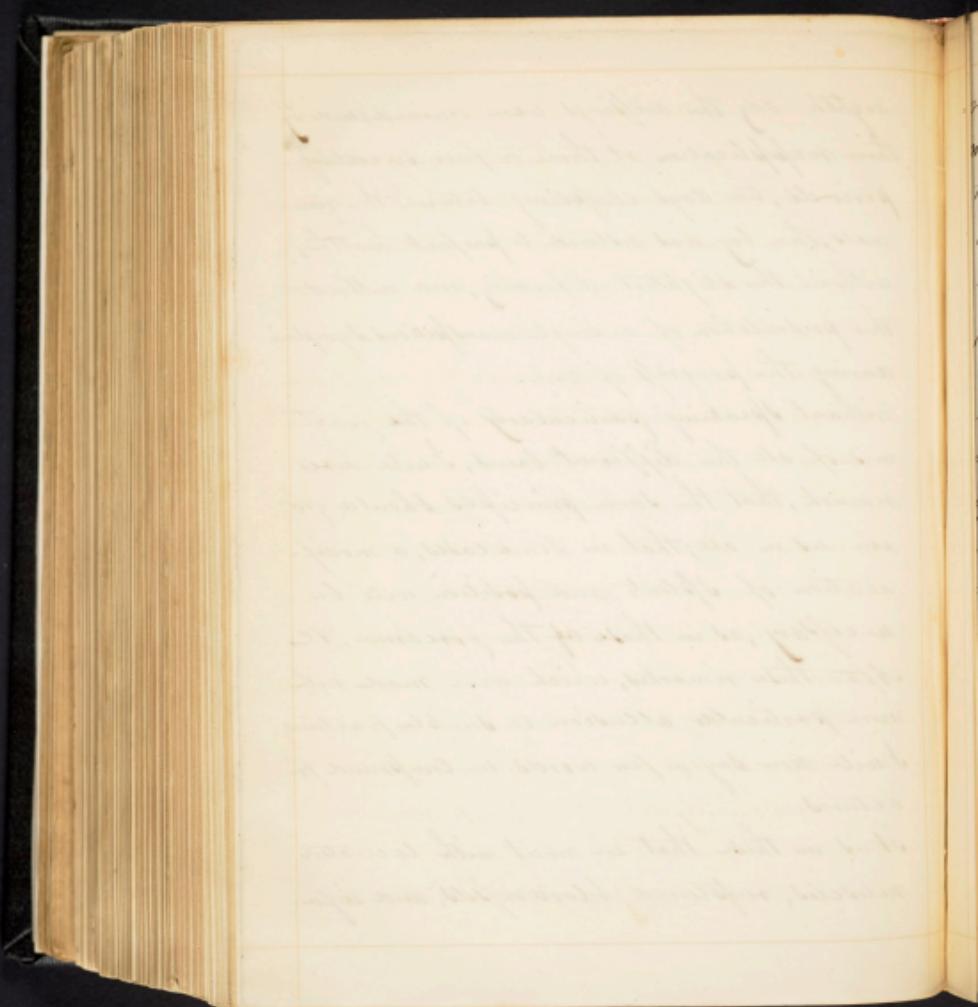
was thrown from his horse in the streets of Lexington - by the fall, his thigh was fractured at or a little above its middle. Dr. Dudley was requested to visit him. The fracture being of the oblique character, the inferior portion was drawn two or more inches upon the posterior surface of the superior fragment. By traction and counter-traction, the fragments were reduced to their proper situation, and being so retained by the same forces; a bandage was applied from the extremitie of the toe to the superior part of the limb, and then passed several times around the pelvis and thus made secure. To prevent displacement, from any involuntary movements of the body, during sleep or otherwise, four splints, about ten inches in length and one and a half or two inches breadth, were then bandaged on with moderate firmness. On the seventh or



eighth day the dressings were removed; and by their reapplication at three or four succeeding periods, ten days elapsing between the removals; the boy was restored to perfect health, without the slightest deformity, and without the presentation of a single unsightly symptom during the progress of cure.

Without speaking particularly of the fractures of all the different bones, I will here remark, that the same principles should govern us in all; that in some cases, a modification of splints and position will be necessary; as in those of the forearm, &c. After these remarks, which were made with more particular allusion to simple fractures, I will now say a few words on compound fractures.

It is in these that we meet with lacerated muscles, ruptured blood-vessels, and inju-



red nerves; and these are the injuries which more than any others, elicit the sympathies of the benevolent and philanthropic practitioners, and call most loudly for assistance from the surgeon. He, in accordance with the most fashionable mode of treatment, places the limb in the most easy and convenient position, and endeavours to moderate inflammatory action, by leeches, lotions, &c; and after ^{the} subsidence of inflammation, places the bones in apposition, and applies his dressings a false and inefficient practice.

What do the surgeon fear in compound fractures? high inflammation, and consequent suppuration, deep-seated abscess, sloughing sinusous ulcers, necrosis of the bone, contraction and deformity, or at least, a protracted and painful cure.

Now as the pathology of the osseous tissue

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teaches us, that a high degree of inflammation, is not a necessary attendant to the ^{secretion} of effick matter, but on the contrary retards and deranges that process; I without hesitation, express it as my decided opinion, that it would be better, after the removal of any detached portions of bone, immediately to place the fragments in their proper position, and having drawn the divided integuments in contact, and secured them by adhesive straps, by the immediate application of the bandage to procure union by adhesion, and thus convert the compound into the simple fracture, than to subject the unfortunate sufferer to the torturing pains accompanying high inflammatory actions, to a long term of acute distress, and to the liability to the evils above mentioned; all of which, not unfrequently present themselves un-

or the common mode of treatment, but none of which could take place, under the influence of a properly adjusted bandage.

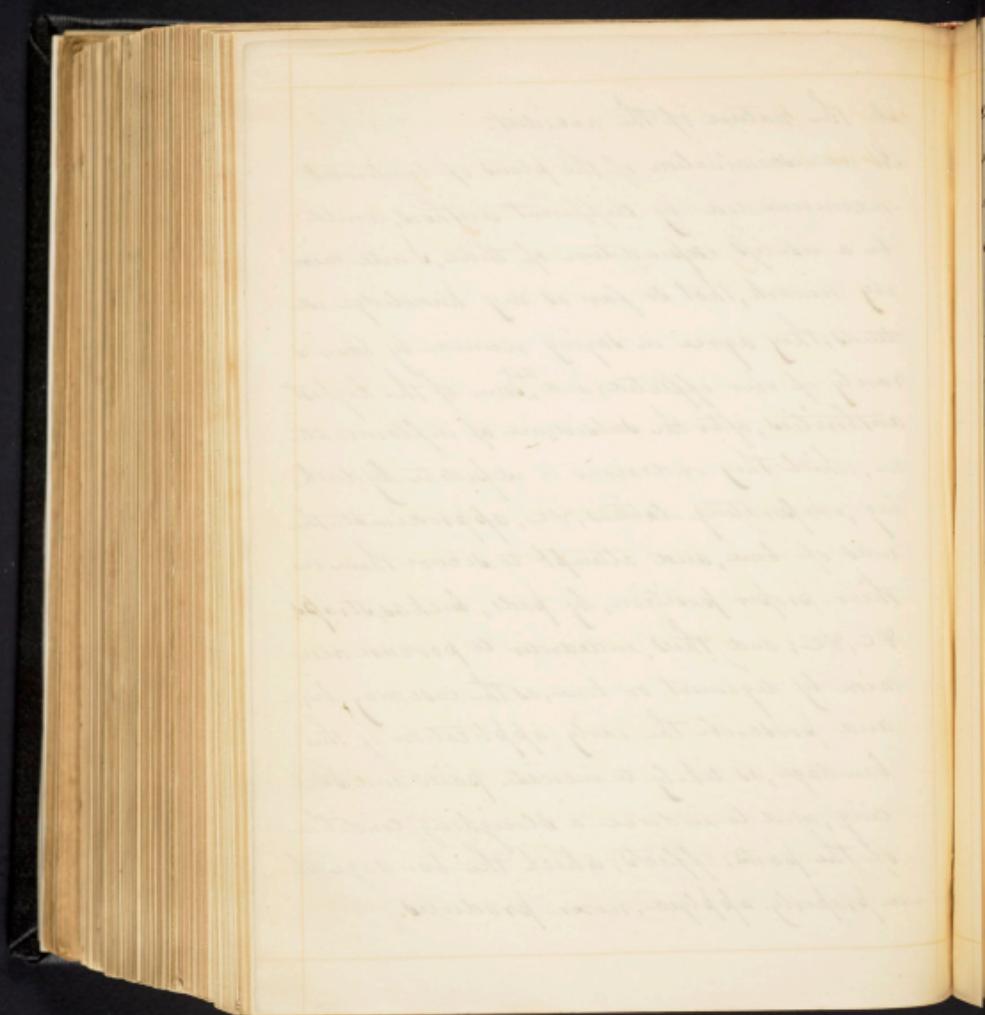
After these introductory remarks on compound fractures, I will proceed to make a few observations on fractures of the patella.

Transverse fractures of the bone are more common; but sometimes it is fractured perpendicularly. When the fracture is of the transverse character; by the action of the rectus, vasti, & cruralis muscles, the ^{superior} fragment is drawn from the lower; in a degree proportionate to the extent of injury sustained by the capsular ligament, and the tenuous aponeurosis covering it.

The depression between the two portions of bone, the situation of the superior fragment on the anterior part of the thigh, and the inability to extend the leg, will clearly indicate

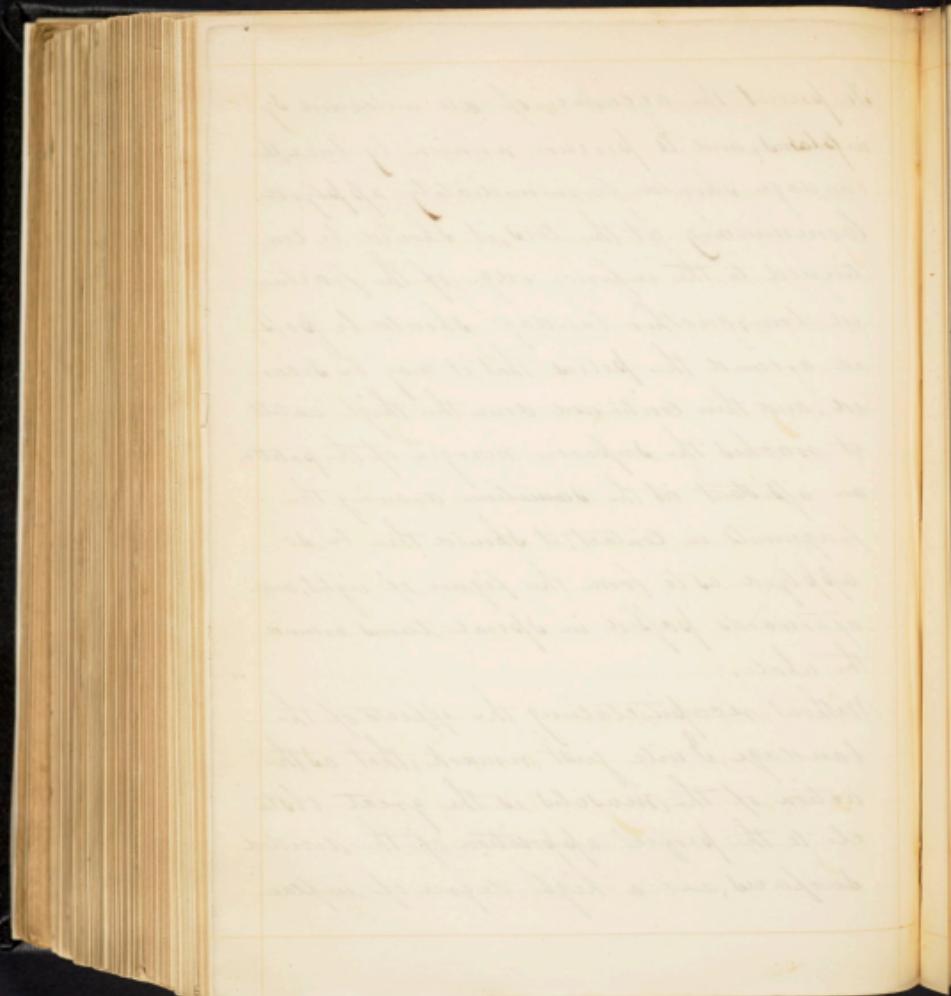
ate the nature of the accident.

As an examination of the plans of treatment recommended by different authors, would be a useless expenditure of time, I will merely remark, that so far as my knowledge extends, they agree in saying union by bone is rarely if ever effected; and ^{that} some of the highest authorities, after the subsidence of inflammation, which they endeavour to expedite by packing, evaporating, fomentations, &c, approximate the ends of bone, and attempt to secure them in their proper position, by pads, buckles, straps, &c, &c; and thus endeavour to procure union by ligament or bone, as the case may be; and proscribes the early application of the bandage, as likely to increase pain and swelling, and to induce a sloughing condition of the parts; effects, which the bandage when properly applied, never produces.



To prevent the occurrence of all unwardly
involutions, and to procure union by bone, the
bandage should be immediately applied.
Commencing at the toes, it should be con-
tinued to the inferior edge of the fractur-
ed bone; another bandage should be pass-
ed around the pelvis that it may be secure-
d, and thus continued down the thigh until
it reaches the superior margin of the patella;
an assistant at the same time drawing the
fragments in contact; it should then be so
applied as to form the figure of eight, and
afterwards passed in spiral turns around
the whole.

Without recapitulating the effects of the
bandage, I will just remark, that as the
action of the muscles is the great obsta-
cle to the perfect apposition of the divided
surfaces, and a high degree of inflam-



uation the only circumstance endangering
the favourable termination of the accident,
these difficulties will be perfectly obviated
by the compressing and paralyzing influ-
ence of the bandage; and in six or eight
days, the patella will be firmly united by bone
matter.

During the progression of recovery, the leg
should be extended on the thigh, and the thigh
flexed on the pelvis. At the expiration of
the fourth week, slight passive motion should
be commenced, and conducted with great
caution. It should be employed from day to
day, until the can be complete.

As a demonstration of the efficacy of the treat-
ment recommended, I will here remark, that
Professor Dudley of Transylvanian Univer-
sity has treated a variety of cases in the
manner above described, and has invariably

effectual reunion by a specific matter.

Compound fractures of the patella are more difficult to manage; and it is in these that the bandage promised to be pre-eminently useful.

The consequences most to be apprehended in these cases, are unmanageable inflammation,继发的 by suppuration, with the highest degree of constitutional irritation.

Now as there is no such thing in nature, as an effect without a cause, and as we know that the suppuration and constitutional irritation are effects of the violent inflammation, to obviate them, we have nothing to do but to prevent the occurrence of their cause; and this will be more certainly effected by the roller, than any mode of practice that can be adopted.

After securing the divided integuments in contact by adhesion straps, the bandage sh

ould be apply'd as directed in cases of simple fracture. The result of this treatment will be union of the soft parts by adhesion, suppression of the inflammation and constitutional irritation which so generally sequelate this injury, and in a few weeks, perfect restoration of function.

The rules laid down for the management of fractures of the patella, are equally applicable to those of the olecranon, and if strictly adhered to, the results will be similar. From the subject of fractures, I will proceed to make a few remarks on luxations.

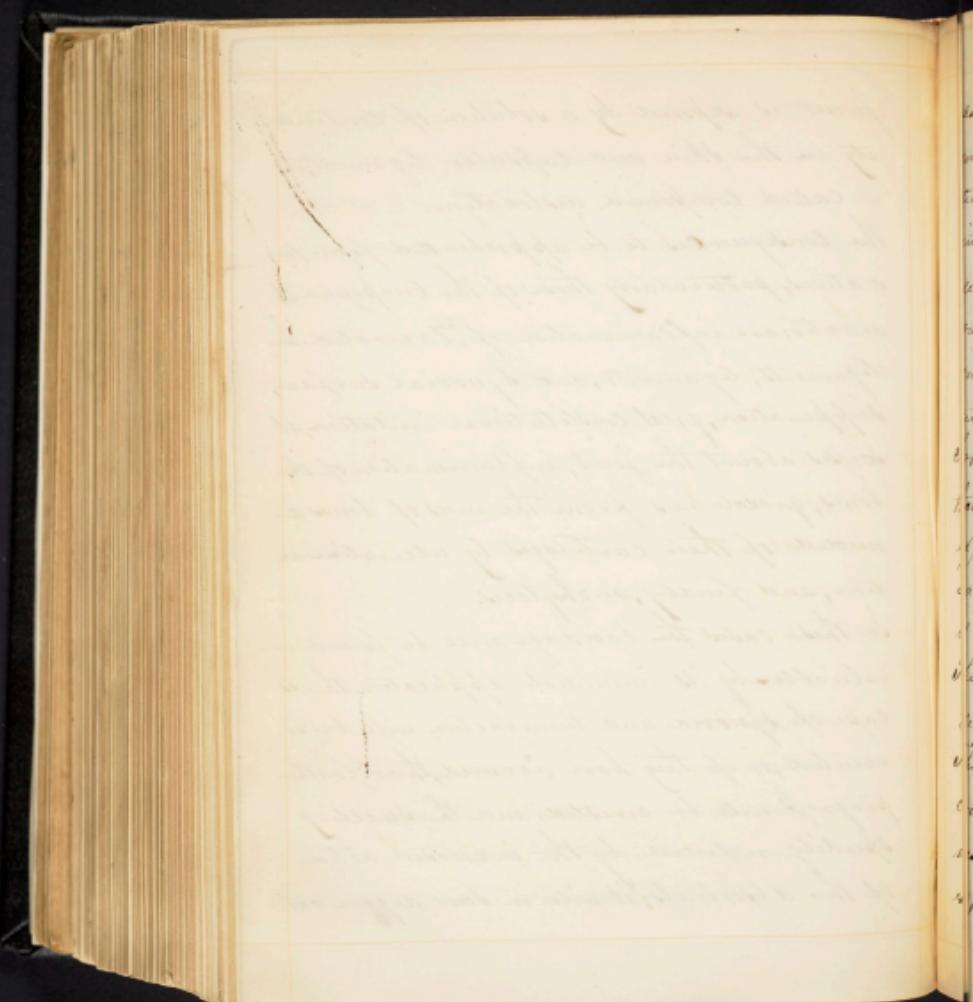
Dislocations.

A dislocation is a displacement of the articulatory portion of a bone from the surface on which it was naturally received. When in addition to the displacement of the articulating surfaces, the cavity of the

joint is exposed by a solution of contusion
it in the skin and capsular ligament, it
is called Compound dislocation.

The consequences to be apprehended from lux-
ations, particularly those of the compound
character, are inflammation of the excised in-
teguments, ligaments, and synovial surface,
suppuration, great constitutional irritation, ab-
scesses about the joint, inflammation of the
bones, protrusions from the ends of bones an-
nected by their cartilage by ulceration ac-
tion, and finally, ankylosis.

In these cases the balsage will be found un-
valuable by its immediate application the ex-
cess of synovia and tumfaction will be in-
evitable; or if they have occurred, their further
progress will be arrested, and the swelling
speedily reduced by the increased action
of the absorbents; it will in some degree act



as an artificial capsule, the divided parts will be retained in contact, inflammatory action will be duly restricted, union by the first intention will issue; and the parts will be speedily restored to their healthy condition, without the manifestation of a single phenomenon calculated to disturb nature in her surgical operations.

From the foregoing remarks it will be observed, that I conceive the bandage to be the most effectual mean in fulfilling the second indication in the treatment of luxations; which is the prevention of high inflammation.

The first indication, is the reduction of the displaced bones to their natural situation. This will be accomplished by extirpation and counter extirpation; aided when necessary, by resection, warm bath, nauseating medicaments, &c.

Were it necessary, I could here detail several cases of compound dislocation, which were treated by the bandage with perfect success, and without the occurrence of any of the unpleasant symptoms, which so frequently follow these accidents.

Gunshot Wounds.

By many of the highest authorities it is said, that a gun-shot in its passage through any portion of the body, destroys the vitality of the parts immediately in its tract, and that sloughing is a necessary step towards suppuration or cure.

As I have neither time nor disposition to enter into a particular examination of the opinions of the many authors on this subject, I will merely remark, that I believe many of them to be incorrect, and that they were based on incorrect views of the pathology of gunshot injuries.

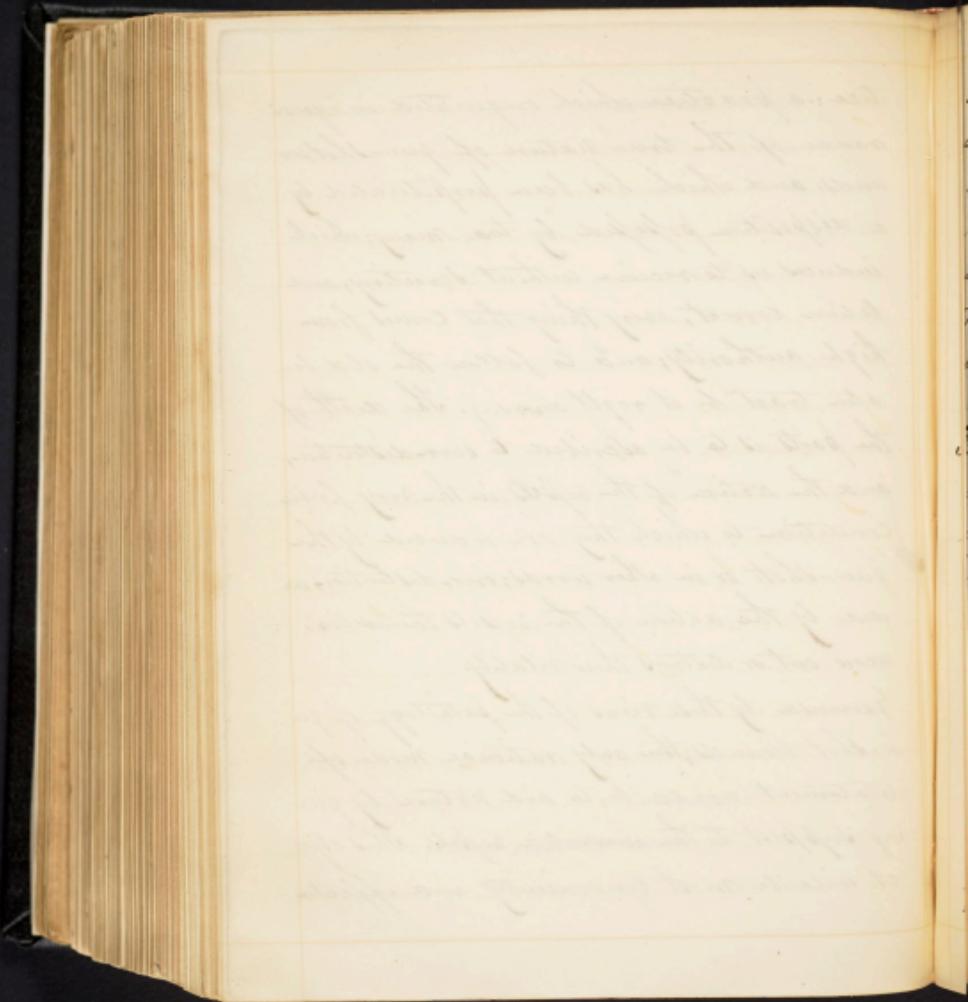
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A gun-shot lacerates and weakens the parts through which it passes, the capillary vessels in its route are debilitated and paralyzed, their capacity for the performance of their functions is temporally suspended; thus unfilled and incapacitated, they admit a free inflow of blood and are unable to expel it, they become engorged, and by their efforts at propagation their vitality is finally exhausted; the blood stagnates and coagulates, and sloughing succeeds.

When nature is unperturbed, this series of events does take place; and then it is said, that a gun-shot kills the parts through which it passes, and that sloughing is essential to recovery. These assertions are erroneous; for instead of the sloughing being a necessary effect of a gun-shot wound, it is nearly a consequence of futile and insufficient prac-

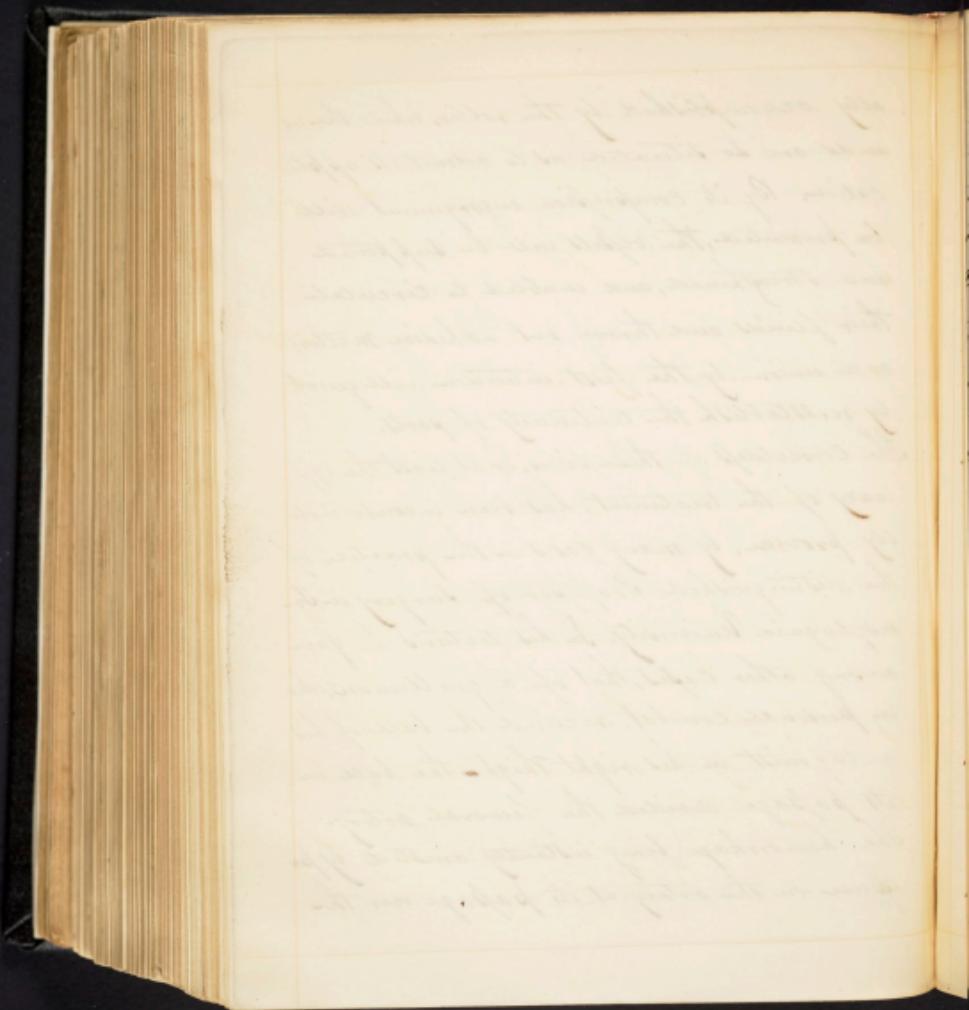
ties; a practice which originated in ignorance of the true nature of gun-shot wounds; and which has been perpetuated by a disposition popularized by too many; which induced us to receive without scrutiny, and believe correct, every thing that comes from high authority; and to follow the old beaten tract be it right or wrong. The death of the parts is to be ascribed to over-distortion, and the action of the vessels in the very condition to which they are reduced by the gun-shot; or in other words; over-distortion, aided by the action of the vessels themselves, wears out or destroys their vitality.

Governed by these views of the pathology of gun-shot wounds; the only rational mode of treatment would be, to aid nature by giving support to the convalescent vessels. This object will be most conveniently and effectually



ally accomplished by the roller, when these
wounds are so situated as to admit its applica-
tion. By its compression engorgement will
be prevented, the vessels will be supported
and strengthened, and enabled to circulate
their fluids and throw out adhesive matter,
and union by the first intention will quick-
ly re-establish the continuity of parts.

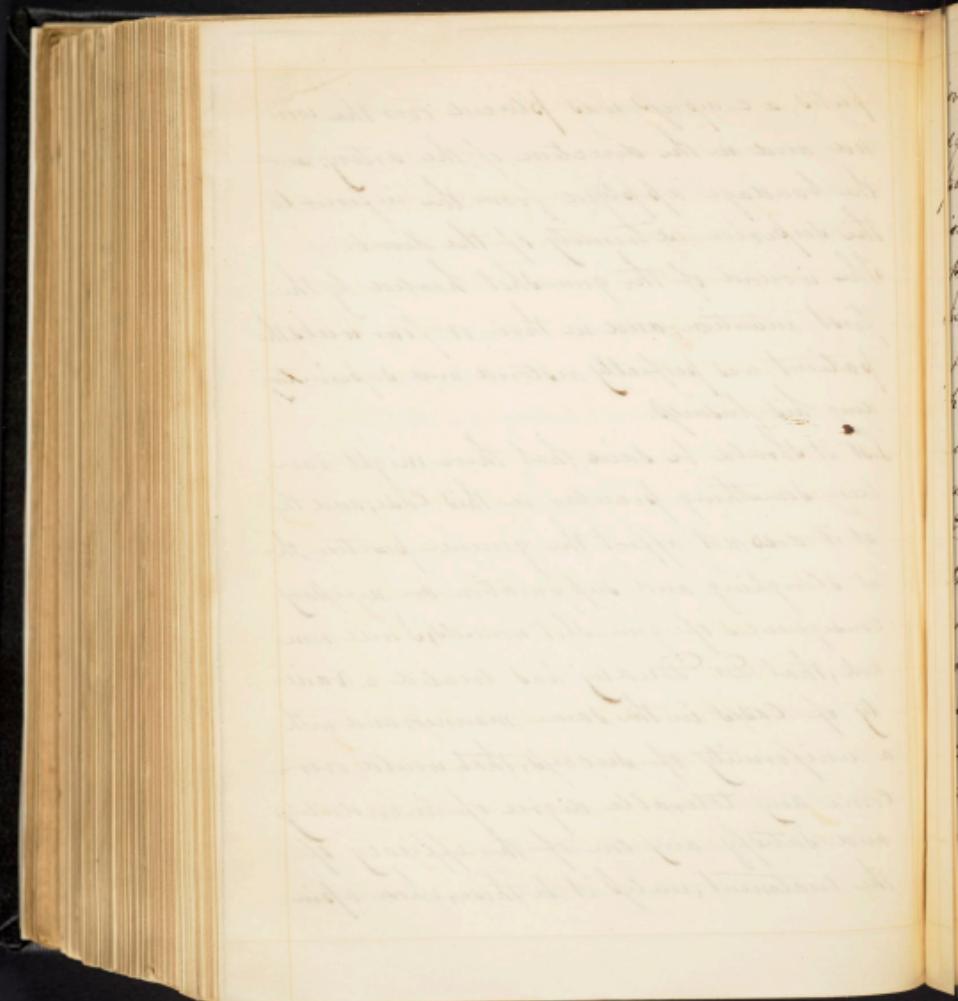
The correctness of this view, or at least the eff-
icacy of the treatment, has been incontrover-
sibly proven, by many cases in the practice of
the distinguished Professor of Surgery in the
Pennsylvania University. In his lectures he gave
among other cases, that of a gentleman, who
in personal combat, received the ball of his
antagonist in his right thigh - the ball in
its passage divided the femoral artery.
The hemorrhage, being instantly arrested by po-
sition on the artery at its passage over the



put'd, a compress was placed over the wound and in the direction of the artery; and the bandage applied from the incisor to the superior extremity of the limb.

The wound of the gun-shot healed by the first intention; and in three or four weeks the patient was perfectly restored and resuming his business.

Let it should be said that there might have been something peculiar in this Case; and that it does not affect the general position, that sloughing and suppuration are necessary consequences of gun-shot wounds, I will remark; that Dr. Dudley has treated a variety of cases in the same manner; and with a uniformity of success, that would overcome any tolerable degree of incredulity, and satisfy any one of the efficacy of the treatment; unless it be those, whose opin-



ions are formed by prejudice rather than judgment; or rather those, who with a blind pertinacity adhere to the precepts and opinions of their predecessor, rather than form opinions for themselves.

In the foregoing pages I have said nothing of Constitutional remedies, but I would not have it inferred that I wish to exclude them, or deem them unessential; on the contrary, I believe them indispensable in many cases—but as the injuries of which I have treated occur in constitutions of very different degrees of susceptibility, and as the same individual is at different periods in quite opposite states of susceptibility to the influence of exciting causes, I shall merely remark, that when general fever succeeds the local violence; as it very frequently will in false robust habit, it will be

necessary to use the lancet, to purge, to draw
dante, and in short to enforce the antiphlogis-
tic regimen to the requisite extent—that these
accidents may present themselves in feeble de-
bilitated constitutions; in which the powers of
Nature are so prostrated that stimulants, lo-
cics, and a free use of nutritious food may
all become necessary: in such cases Nature
must be supported and elevated to the
healing point—that these injuries will oc-
casionally be met with in individuals la-
boring under chylotrophic derangement
such cases it will be expedient to correct
the morbid condition of the Stomach, liv-
er, &c, by the judicious exhibition of the
wine, Calomel, the mineral acids, &c.
In fine, the good sense of the Surgeon must
adapt his remedies to the peculiarities of each Case. With these remarks

and a great deal of time in
the field and in the laboratory
and in the library. The work
is very interesting and
the people are very friendly.
I am learning a great deal
about the ecology of the
various species of plants
and animals. I am also
learning about the
geology of the area.
The work is very demanding
but I am enjoying it very
much. I am learning a
lot about the natural
world and I am very
grateful for the opportunity
to work in such a beautiful
place.

close my paper, at the same time apologizing for its many imperfections.

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